

CLAIMS

- 1 1. A magnetic head for a hard disk drive, comprising:
 - 2 a write head portion, including:
 - 3 a first magnetic pole;
 - 4 a second magnetic pole having a relatively large yoke portion and a narrow pole
 - 5 tip;
 - 6 a pole tip heating element being disposed proximate said pole tip for providing
 - 7 heat energy thereto.

- 1 2. A magnetic head as described in claim 1 wherein said write head portion further
- 2 includes an induction coil being disposed in part between said first magnetic pole and
- 3 said second magnetic pole and wherein said heating element is electrically connected
- 4 with said induction coil.

- 1 3. A magnetic head as described in claim 2 wherein said heating element is
- 2 electrically connected in series with said induction coil.

- 1 4. A magnetic head as described in claim 3 wherein said heating element includes a
- 2 first electrical lead, a relatively narrow heating portion and a second electrical lead, and
- 3 wherein said first electrical lead is electrically connected with an electrical interconnect
- 4 contact pad of said induction coil.

1 5. A magnetic head as described in claim 4 wherein said heater portion of said
2 heating element is comprised of a thin film material, and said electrical leads are
3 comprised of one or more layers of electrically conductive material.

1 6. A magnetic head as described in claim 1 wherein a write gap layer is disposed
2 between said first magnetic pole and said second magnetic pole tip, and wherein said
3 heating element is disposed on a side of said pole tip that is away from said write gap
4 layer, such that said pole tip is disposed between said write gap layer and said heating
5 element.

1 7. A magnetic head as described in claim 6 wherein said write head portion further
2 includes an induction coil being disposed in part between said first magnetic pole and
3 said second magnetic pole and wherein said heating element is electrically connected
4 with said induction coil.

1 8. A magnetic head as described in claim 7 wherein said heating element is
2 electrically connected in series with said induction coil.

1 9. A magnetic head as described in claim 1 wherein said heating element has an
2 electrical resistance of approximately .2 to 1.0 ohms.

1 10. A magnetic head as described in claim 1 wherein the heating energy of the
2 heating element is approximately .3 to 1.6 mW.

1 11. A magnetic head as described in claim 1 wherein said heating element includes at
2 least two legs, wherein a first said leg provides heat energy to said pole tip and a second
3 leg provides an alternative electrical path for electrical current passing through said
4 heating element.

1 12. A magnetic head as described in claim 1, wherein a write gap layer is disposed
2 between said first magnetic pole and said second magnetic pole yoke, and wherein said
3 heating element is disposed between said write gap layer and said yoke.

1 13. A magnetic head as described in claim 2 wherein said heating element is
2 comprised of a material selected from the group consisting of Cu, W, NiFe, NiCr and
3 IrRh.

1 14. A hard disk drive including a magnetic head, comprising:
2 at least one magnetic media disk;
3 at least one actuating arm for holding the magnetic head;
4 wherein the magnetic head includes:
5 a write head portion, including:
6 a first magnetic pole;

7 a second magnetic pole having a relatively large yoke portion and a narrow pole
8 tip;
9 a pole tip heating element being disposed proximate said pole tip for providing
10 heat energy thereto.

1 15. A hard disk drive including a magnetic head as described in claim 14 wherein said
2 write head portion further includes an induction coil being disposed in part between said
3 first magnetic pole and said second magnetic pole and wherein said heating element is
4 electrically connected with said induction coil.

1 16. A hard disk drive including a magnetic head as described in claim 15 wherein said
2 heating element includes a first electrical lead, a relatively narrow heating portion and a
3 second electrical lead, and wherein said first electrical lead is electrically connected with
4 an electrical interconnect contact pad of said induction coil.

1 17. A hard disk drive including a magnetic head as described in claim 14 wherein a
2 write gap layer is disposed between said first magnetic pole and said second magnetic
3 pole tip, and wherein said heating element is disposed on a side of said pole tip that is
4 away from said write gap layer, such that said pole tip is disposed between said write gap
5 layer and said heating element.

1 18. A hard disk drive including a magnetic head as described in claim 17 wherein said
2 write head portion further includes an induction coil being disposed in part between said

3 first magnetic pole and said second magnetic pole and wherein said heating element is
4 electrically connected with said induction coil.

1 19. A hard disk drive including a magnetic head as described in claim 14 wherein said
2 heating element has an electrical resistance of approximately .2 to 1.0 ohms.

1 20. A hard disk drive including a magnetic head as described in claim 14 wherein the
2 heating energy of the heating element is approximately .3 to 1.6 mW.